

# **ENVIRONMENTAL ASSESSMENT**

## **Protection of the Stehekin Valley Road in the Vicinity of McGregor Meadows**

**Lake Chelan  
National Recreation Area**

March 2004

### **Public Availability**

Comments on this Environment Assessment must be postmarked (surface mail) or sent (e-mail or fax) no later than **April 8, 2004**.

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Superintendent  
North Cascades National Park Service Complex  
810 State Route 20  
Sedro-Woolley, WA 98284

You may also comment via the Internet to:

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Please submit Internet comments as an ASCII file avoiding the use of special characters and any form of encryption. Please also include "Attn: Dan Allen" and your name and return address in your Internet message. If you do not receive a confirmation from the system that we have received your Internet message, contact Dan Allen directly at (360) 856-5700 x 367 or e-mail [dan\\_allen@nps.gov](mailto:dan_allen@nps.gov) with the subject: Environmental Assessment.

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## PURPOSE AND NEED

The purpose of the proposed action is to maintain vehicular access to the upper Stehekin Valley by protecting the Stehekin Valley Road from erosion by the Stehekin River in the vicinity of McGregor Meadows. This action is needed to insure continued vehicle access to visitor service facilities, popular recreational opportunities and other features and attractions in the upper Stehekin Valley, Lake Chelan National Recreation Area and to North Cascades National Park. In addition, this action will provide for continued vehicle access to private property in McGregor Meadows and farther up-valley.

McGregor Meadows is located about 5.5 miles above Stehekin Landing. In this Assessment, the area referred to as McGregor Meadows is defined by its boundary with the Stehekin River on three sides, and on the other side by the Stehekin Valley road (Figure 1). This landscape is within the floodplain of the Stehekin River. The Stehekin Valley road is the only vehicle access route to the upper valley for private residents and visitors to Lake Chelan National Recreation Area and North Cascades National Park. In the McGregor Meadows area the road has been in its current alignment since the 1920's.

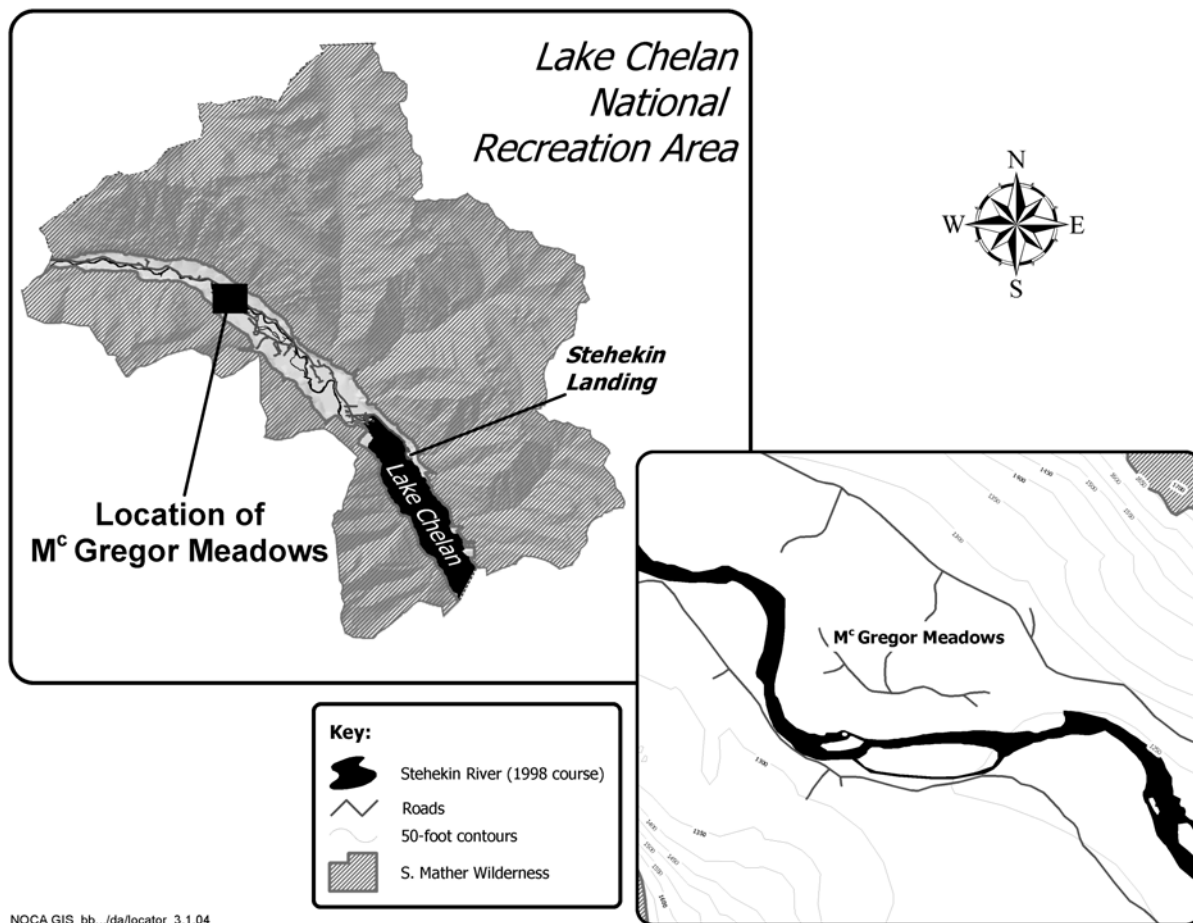


Figure 1. Project area, McGregor Meadows, Lake Chelan National Recreation Area.

Recent river activity has led to considerable flood damage in this area, and it appears the Stehekin River may be rerouting through McGregor Meadows. Recent changes in the river, including deposition above McGregor Meadows raising the river bed, and accelerated damage to public and private land and property occurred with the passage of large floods in 1989, 1990, 1995, 1997, and the record flood of October

2003. Damage included scouring of the Stehekin Valley Road to depths of two to three feet, and the movement of large quantities of crushed gravel into downstream wetlands and flood channels. The 1995 flood damaged private property and forced the NPS to abandon a government house, well and shop.

Frequent seasonal flooding has not deterred human occupation of McGregor Meadows. The area was initially occupied by homesteaders, and later developed by private landowners. Development included clearing for homes, roads, gardens, and fields/pasture. About 23 acres (9 tracts) of private land was previously purchased by the National Park Service.

The Stehekin Valley Road is the only vehicle access to 12 parcels of private property in the McGregor Meadows area. Above McGregor Meadows the Stehekin Valley Road provides access to the privately owned Stehekin Valley Ranch. The Ranch provides various visitor services during the summer season including cabins and a restaurant. About two miles above the Ranch, at High Bridge the road enters North Cascades National Park.

A concession bus provides visitor transportation from the Stehekin Landing to High Bridge. A National Park Service shuttle bus provides transportation an additional nine miles in North Cascades National Park.

## **POLICY AND CONSTRAINTS**

### **National Park Service Management Policies (2001), 4.6.4 Floodplains:**

*In managing floodplains on park lands, the National Park Service will (1) manage for preservation of floodplain values; (2) minimize potentially hazardous conditions associated with flooding; and (3) comply with the NPS Organic Act and all other federal laws and Executive orders related to the management of activities in flood-prone areas, including Executive Order 11988 ( Floodplain Management), NEPA, applicable provision of the Clean Water Act, and the Rivers and Harbors Appropriate Act of 1899. Specifically, the Service will:*

- *Protect, preserve, and restore the natural resources and functions of flood plains;*
- *Avoid the long- and short-term environmental effects associated with the occupancy and modification of floodplains; and*
- *Avoid direct and indirect support of floodplain development and actions that could adversely affect the natural resources and functions of floodplains or increase flood risks.*

*When it is not practicable to locate or relocate development or inappropriate human activities to a site outside and not affecting the floodplain, the Service will:*

- *Prepare and approve a statement of findings, in accordance with procedures described in Director's Order 77-2: Floodplain Management; and*
- *Use non-structural measures as much as practicable to reduce hazards to human life and property, while minimizing the impact to the natural resources of floodplains; and*
- *Ensure that structures and facilities are designed to be consistent with the intent of the standards and criteria of the National Flood Insurance Program (44 CFR Part 60).*

**General Management Plan and Environmental Impact Statement, Lake Chelan National Recreation Area, 1995 (LACH GMP/EIS):**

Actions affecting the Stehekin River and Stehekin Valley Road are defined in the LACH GMP/EIS:

***Stehekin River***

***Management Objective.*** Preserve and restore the free-flowing character and natural processes of the Stehekin River and its tributaries with consideration for protecting the public road system.

***Actions.*** The National Park Service would not manipulate the Stehekin River to protect federal property except roads and bridges according to the following criteria. Existing public roads would be protected in erosion/river conflict zones only if (1) there are no feasible alternatives, (2) funds are available, (3) proposed actions would have lesser impacts than other alternatives, and (4) the proposed actions are permitted by the county, state, and other federal agencies. No new road construction would be proposed in active river/erosion conflict zones.

Previously manipulated sites that do not meet the above criteria for future manipulation would be restored to approximate natural conditions.

The Park Service would not manipulate the river to protect private property. No action would be taken to prevent private owners from manipulating the river on their land to protect their property unless such actions would significantly harm recreation area resources or were in violation of local, state, or federal ordinances, regulations, or laws. Such actions would not be encouraged, however. (p.20)

Measures to minimize the environmental impacts associated with implementation of the LACH GMP/EIS are identified in the following management plans:

**Sand, Rock, and Gravel Plan:** *The management objectives are to allow mining of sand, rock, and gravel in the valley but restrict mining to the Company Creek pit for NPS maintenance and public use and minor reconstruction only and to allow for importing of material from outside the valley for new construction. ...Sand, rock, and gravel will be conserved and recycled whenever possible (for example, consider conservation through maintenance and road system design)....To ensure conservation of sand, rock, and gravel, the National Park Service proposes to limit the use of in-park material to 1,400 cubic yards per year: 1,200 cubic yards for NPS use and 200 cubic yards per year for private use over a proposed 10-year excavation cycle -- i.e., in the event of a large flood, the remaining 10-year stockpile could be used in one year....The superintendent will have the option to exceed the established limit in the event of an emergency such as a major flood;...(pp.3, 10-11).*

**Transportation Plan:**

*Between Harlequin Bridge and 9-Mile, the road width will be paved and reduced to a single-lane (12–14 feet wide) with pullouts that will be visible from each other (18 feet wide, 30–35 feet long).*

*Public roads below Cottonwood will be protected in active river erosion zones only if (1) there are no feasible alternatives, (2) funds are available, (3) the actions will have less impacts than other alternatives, and (4) the actions are permitted by the county, state,*

*and other federal agencies. No new road construction will be proposed in active river erosion zones. (p.9).*

## **ALTERNATIVES**

The NPS guideline for “Conservation Planning, Environmental Impact Analysis and Decision Making (NPS-12 Handbook) requires identification of the “environmentally preferred” alternative. This is “... *the alternative that causes the least damage to the biological and physical environment; it also means the alternative which best protects, preserves, and enhances historic, cultural and natural resources*”. The “preferred” alternative is the proposed action. It is the alternative that park management believes does the best job of satisfying the objectives as laid out in the purpose section.

### **Alternative A. No Action (Environmentally preferred alternative)**

No additional action would be taken to protect the road. The river would continue to flow more frequently and with greater depth and velocity along and down the road during floods as the Stehekin River realigns down No Name Creek. There is the potential for the river to cross the road at the upper end of McGregor Meadows and again at the lower end. There is also the potential for the river to occupy the road as the path of least resistance through the entire McGregor Meadows reach. It is important to note that potential impacts would increase over time as flow from the Stehekin River increased through the McGregor Meadows area

Road damage from flood events would be repaired as soon as possible to maintain access to the private properties in and above McGregor Meadows.

### **Alternative B. Construct Grade Control Structures and Place a Rise in the Road (Preferred Alternative)**

Under this alternative eight to ten grade control structures would be constructed in overflow channels in McGregor Meadows and a rise would be placed in the Stehekin Valley Road (Figure 2). Each grade control structure would use one to two cubic yards of large angular rock each, for a maximum total of 10 to 20 cubic yards. Installation of the grade control structures would require excavation of a trench across the overflow channels just above the head cut (area of active erosion) and filling it with large angular rock (Figure 3). Access to the sites would be directly from the Stehekin Valley road. Existing routes would be used to the extent possible. Where routes do not exist, access would be through existing clear areas. No additional clearing would be done nor would routes be graded. The rise in the road would span the existing road width and would be about two feet high at the highest point gradually tapering down to existing road level. Total length of the rise would be 50-100 feet. This feature would prevent flood water from occupying the road. The rise would not interfere with safe use and maintenance of the road.

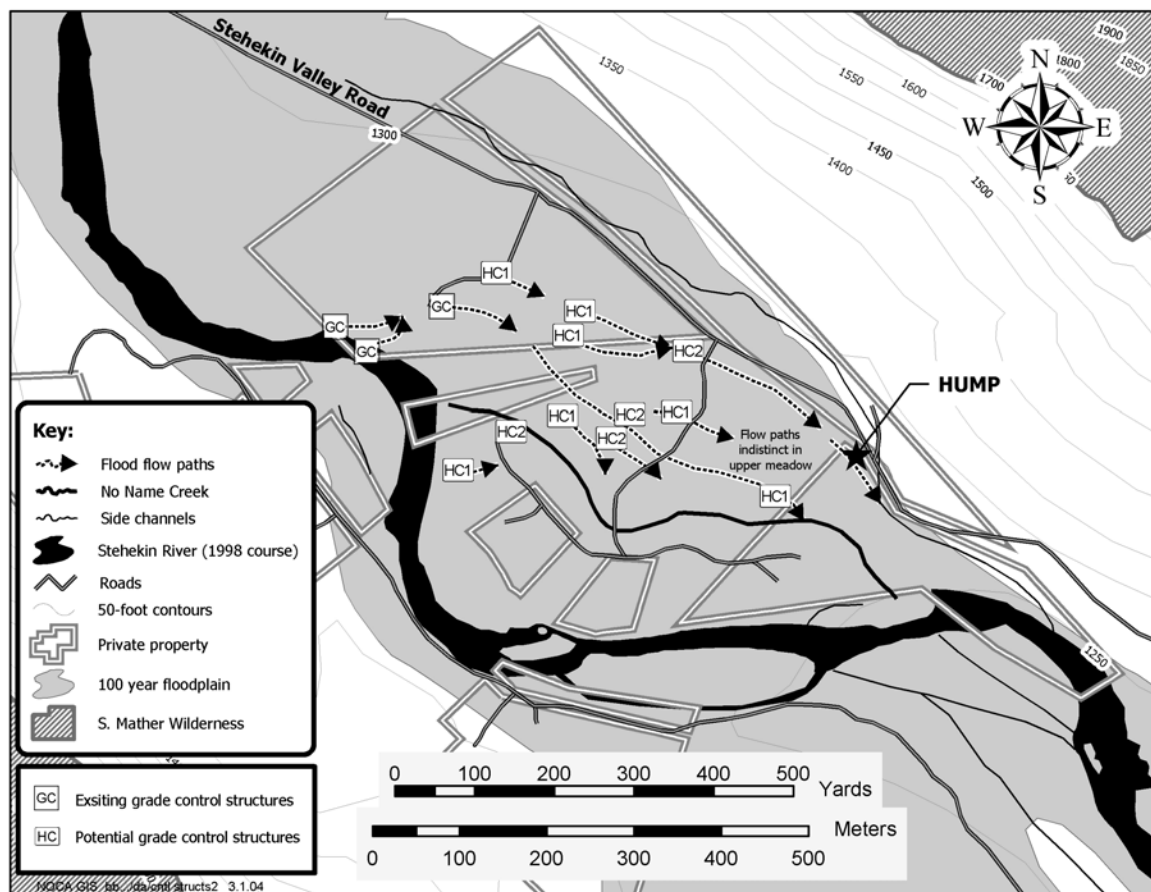


Figure 2. Location of existing and proposed grade control structures.

These actions would be designed to maintain sheet flow through McGregor Meadows and to minimize channelization of floodwater flow down the Stehekin Valley Road, thus reducing scouring of the Stehekin Valley Road and damage to private property. Grade control structures would not prevent flooding of McGregor Meadows or the Stehekin Valley Road, and they would not prevent the Stehekin River from ultimately cutting a new channel through McGregor Meadows.

The primary purpose of the grade control structures and the rise in the road would be to maintain sheet-flow flooding of the meadows by limiting the growth of flood channels through the meadow, and to limit the river's ability to flow down the Stehekin Valley Road. This option, however, is not seen as a permanent fix for the flooding and erosion problem. Over the long term the Stehekin River is expected to reclaim an old channel along No Name Creek through the middle of the McGregor Meadows. In this process it is likely that the river will continue to fill the existing river channel with gravel, deposit large woody debris near the upper end of the meadow, and erode the banks of the current channel.



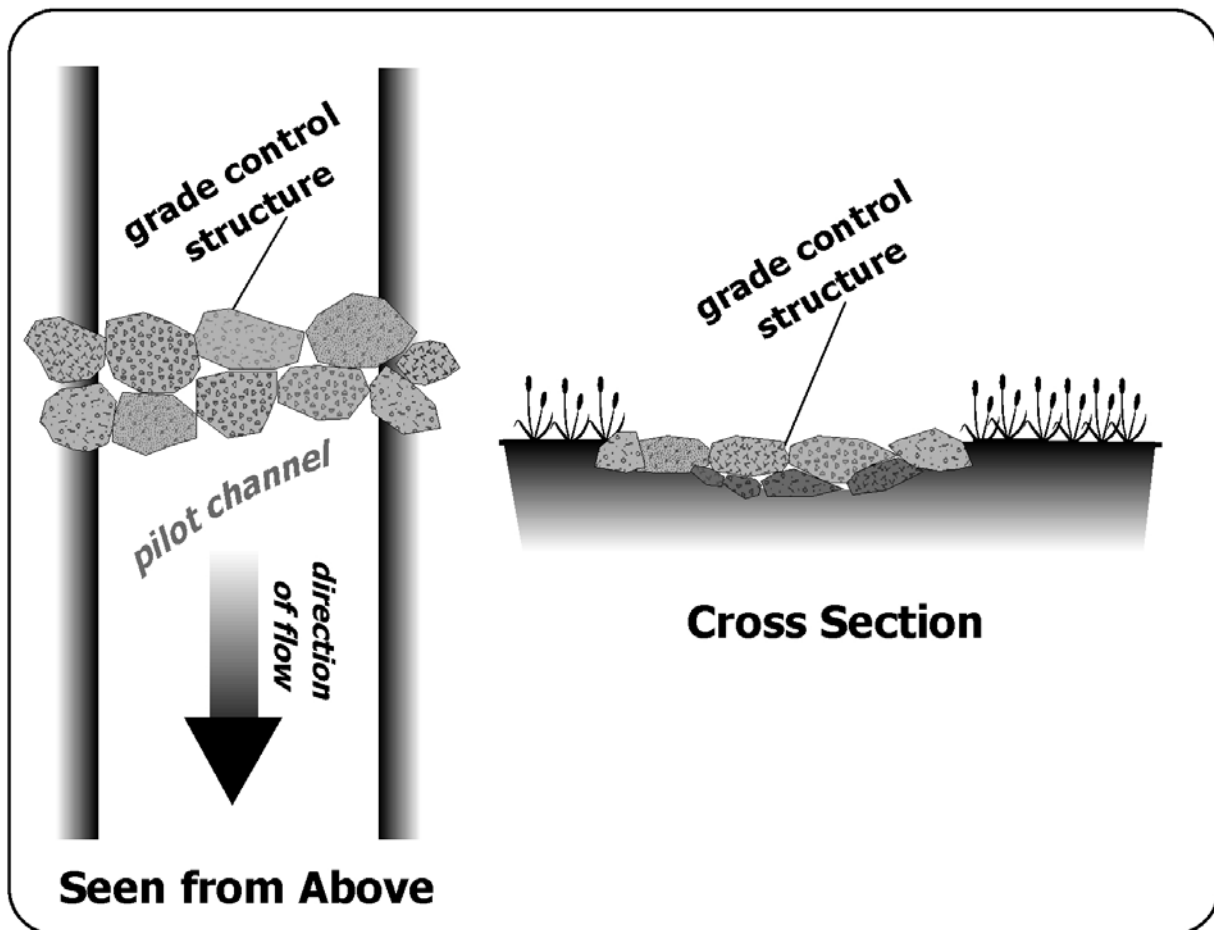


Figure 3. Schematic of proposed grade control structures.

### **Alternative C. Raise the Roadbed Through Lower McGregor Meadows**

The roadbed would be raised approximately three feet from a point half-way through McGregor Meadows to the southern end below Danielsons (tract 07-199), a distance of about 0.6 mile (Figure 4). Further, at several locations the road shoulder would need to be armored with large angular rock. This would prevent the river from crossing or occupying the roadbed. A culvert(s) would be necessary under the raised road bed at the lower end to prevent damming of water.

Raising the road bed three feet for about 0.6 mile would require an estimated 8,200 cubic yards of rock and fill from the Company Creek pit. Approximately 2,000 cubic yards of large rock would also be needed to place along the river side of the raised roadbed to prevent erosion.

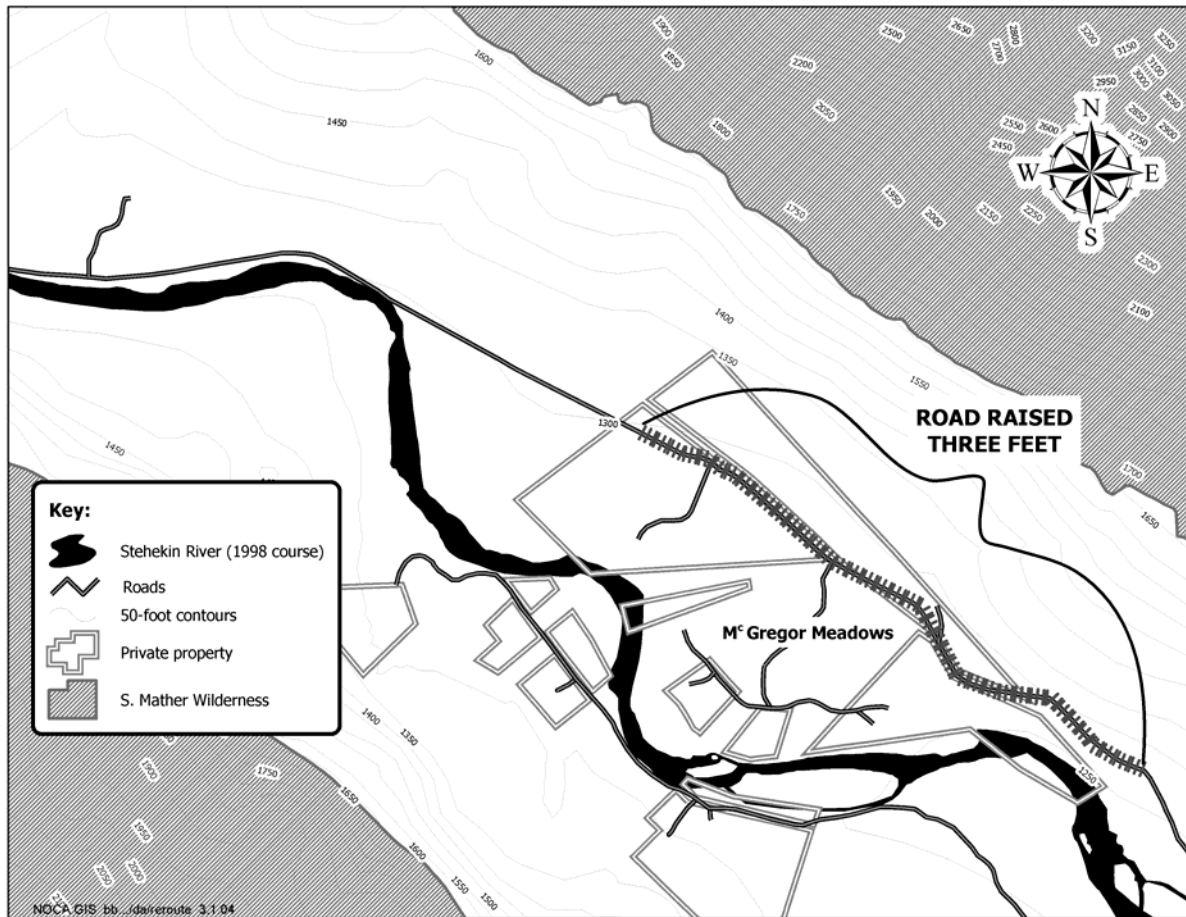


Figure 4. Stehekin Valley Road to be raised in McGregor Meadows area.

#### ALTERNATIVES CONSIDERED, BUT REJECTED

- Raise and armor the river bank above McGregor Meadows. This was rejected due to potential impact on river dynamics and aquatic resources. It was also considered impractical due to the large quantities of angular rock that would have to be shipped in for the project.
- Reroute the road out of the floodplain. This was rejected because of the amount of spotted owl habitat that would be removed as a result of clearing for a new road alignment. In addition, the existing road would still have to be maintained to provide access to private property. This would result in parallel road systems. About two miles of the road would be rerouted to the hillside to the northeast of existing private property. The reroute would require clearing an area at least 30 feet wide and two miles long (over seven acres). At least one fourth of the distance would require significant excavation of the side slope in order to provide a level driving surface. Several intermittent streams would require crossing.
- Close the road above McGregor Meadows and convert the old roadway to a trail. Under this alternative the NPS would no longer maintain the road for vehicle use above mile 5.5 and the roadway would be rehabilitated to form a multi-use trail. This alternative was rejected as it is contrary to the decision made in the LACH GMP/EIS. Vehicle access to private property at and up-valley from McGregor Meadows would be eliminated. There would be no vehicle access to various recreation sites and to North Cascades National Park.

## **DESCRIPTION OF THE ENVIRONMENT**

The area known as McGregor Meadows is located between approximately miles 5.5 and 6.5 from the Stehekin Landing on the Stehekin Valley Road. Elevation ranges from approximately 1,250 feet mean sea level (msl) at the lower end of the meadow area to 1,300 feet msl at the upper end about one mile farther up valley.

### **Geology and Soils**

The Stehekin Valley is cut deeply into resistant Skagit Gneiss bedrock. Local relief measures over 6,000 feet, from 1,200 feet on the valley floor to over 8,000 feet on the summit of McGregor Mountain. The valley has a U-shape typical of glaciated valleys, with a wide, flat floor, bounded by steep valley walls.

Valley walls are composed of rock, colluvium and glacial deposits. The northeast end of the McGregor Meadows area is a large lateral moraine deposited by a glacier that occupied this valley approximately 17,000 years ago. This moraine has limited eastern migration of the river, while a high terrace on the opposite river bank limits flooding of the right bank.

The valley floor is composed of a wide range of landform and material types deposited by running water. Low-elevation river terraces, old river channels, and floodplain features dominate the landscape since most of McGregor Meadows is in the 100-year floodplain of the Stehekin River (Figure 5).

Just upstream of McGregor Meadows the width of the Stehekin Valley widens dramatically and the gradient of the river decreases, resulting in active deposition of gravel and large woody debris in this part of the valley. Therefore, the entire valley between the moraine and terrace can essentially be viewed as an alluvial fan because the river has used multiple channels between these features. The eroding road sections are located on a low river terrace only a few feet vertically in elevation above the active river channel. During the 100-year flood, the flow depths on the lower road were approximately three feet.

McGregor Meadows is a flat terrace that is less than four feet vertically above the Stehekin River at low flow. An old channel of the river bisects the meadow, and is locally referred to as No Name Creek (Figure 5). This old channel is about 250 feet wide at its lower end, but is indistinct at its upper end due to deposition of flood sediments during the past 100 years.

A thin strip of land along the west edge of the meadows lies above the 100-year floodplain. This includes private cabins, undeveloped public and private tracts, and lifetime estates (a “lifetime estate” describes a situation where private property has been acquired by the National Park Service but the sellers retain use of the property for their lifetime). This strip is being eroded by the Stehekin River on the southwest. Access to these tracts from the east is threatened as 2003 floodwaters destroyed a small bridge. A footbridge downstream survived the flood.

Soils in this area are poorly developed on the floodplain due to their coarse texture and recent age. Soil type also varies widely due to the wide range of parent materials, including fine sediment deposited in inactive channels and wetlands, and coarse soils in recently occupied river channels. Stapaloop series and aeris fluvaquents are formed in finer grained soils east of the Stehekin Valley Road, and in parts of McGregor Meadows. Goddard series soils are formed in coarse-grained, recent river deposits on the floodplains and low terraces that compose most of the meadows. These soils are non-cohesive and subject to rapid rates of erosion.

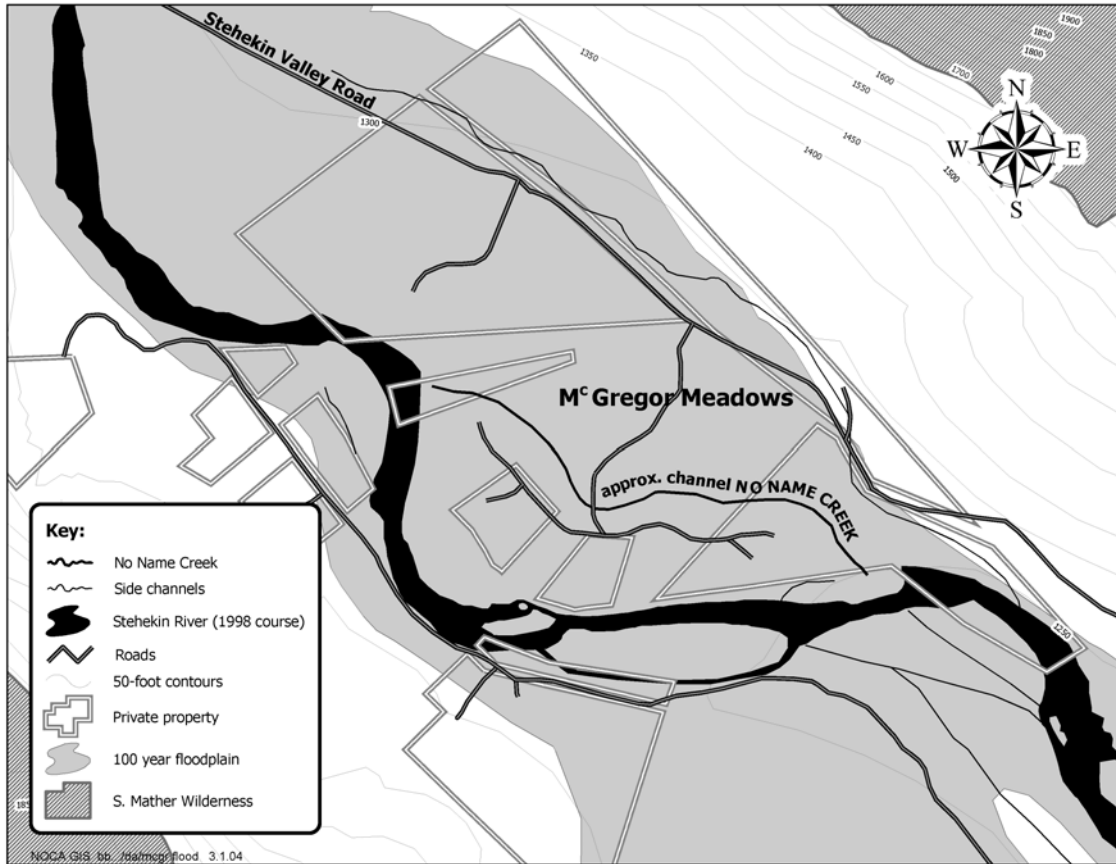


Figure 5. McGregor Meadows 100-year flood plain.

## Hydrology

The U.S. Geological Survey (USGS) has maintained a gage on the Stehekin River since 1911, although no information was collected between 1917 and 1926. The gage, located 1.3 miles upriver from Lake Chelan, provides valuable data on the timing and magnitude of flooding. Based on this long record of measurement, the discharge and frequency of large magnitude floods can be predicted for the purposes of management (Table 1).

Table 1. Estimated discharge and frequency of large magnitude floods on the Stehekin River. Discharge values are estimated at the USGS gage #12451000. Frequency estimates based on log-Pearson Type III analysis by Zembrzuzski, USGS, Water Resources Division.

Discharge (cubic feet/second)	Recurrence Interval
14,570	10 years
18,400	50 years
19,920	100 years
23,270	500 years

A flood carrying 25,600 cubic feet per second (cfs) on October 20, 2003 is the largest flood recorded on this river in 85 years (Table 2). This flood and the 1995 flood caused major changes on the Stehekin River, and resulted in associated damage to the Stehekin Valley Road and NPS housing in McGregor

Meadows. Large magnitude floods have become more frequent in the past decade. In the past 12 years there have been 10 events exceeding 10,000 cfs, compared to only three between 1976 and 1986. The increased frequency of floods of this magnitude has created the need to assess alternative treatments to protect the road.

The Stehekin River is particularly prone to frequent flooding because of its geographic position and steep, rocky slopes. The headwaters are located near Cascade Pass on the crest of the Cascade Range. This location places the upper part of the valley farther west, in an area of higher precipitation, than other east side streams, such as the Twisp and Methow Rivers.

Table 2. Largest floods on record for the Stehekin River, in order of magnitude.

Date	Discharge (cfs)
October 20, 2003	25,600
November 29, 1995	21,000
May 29, 1948	18,900
June 20, 1950	18,400
December 26, 1981	17,300
June 16, 1974	16,600
November 24, 1990	14,700
June 2, 1969	14,400
June 10, 1972	14,400

As indicated in Table 2, the Stehekin River is prone to severe flooding at two times each year, spring and fall. Spring snowmelt floods occur in May and June. Spring floods can vary greatly from year to year, however, the average spring flood on the Stehekin River from 1950 to 1992 was 8,891 cfs at the USGS gage. Larger than average spring floods occur when the snowpack persists into late May and June. Warm late spring rains then cause rapid rates of snow melting. These floods can last for more than a week. Five of the eight largest floods on record were spring events, including the 1948, 1950, and 1997 spring floods.

Fall and early winter rain-on-snow floods occur after some snow has accumulated in the mountains. A warm front bringing rain can melt the snow rapidly, adding water to the already rain-filled channels. Fall rain-on-snow events primarily affect the upper valley and its tributaries located in the western part of its watershed. These floods typically larger and more destructive than the spring floods. They have higher discharge peaks, but are of shorter duration than spring floods, and usually last one day or less. The 1990, and 1995 floods were fall rain-on-snow floods.

The lower Stehekin River has two or more channels at most locations and its use of these channels can alternate over time. As one channel plugs with wood and sediment, the other is eroded and becomes the primary channel for movement of water, wood and gravel. The minor channel shifts within this reach over the past 50 years however, are small compared to the larger channel changes that are now occurring in McGregor Meadows. Figure 6 shows changes in the Stehekin River channel in the McGregor Meadows area from 1953 to 2004. Floods within the last 20 years have moved immense amounts of sediment into the channel adjacent to McGregor Meadows. River sinuosity has increased as gravel bars have grown.

Recent deposition of sediment in the modern channel of the river has set the stage for future occupation of No Name Creek. Since the 1980's more and more water has gone down No Name Creek, through McGregor Meadows, and impacted the Stehekin Valley Road. This is illustrated by the formation of a

large logjam near the old junction between the river and channel. Since the 1995 flood this jam has grown to a length of more than 500 feet. The 2003 flood event pushed through this log jam. It appears that the Stehekin River is reoccupying it's old channel down No Name Creek. It is possible that in the next few floods, depending on their frequency and magnitude, the river will abandon its modern channel and occupy No Name Creek.

The river channel adjacent to McGregor Meadows consists primarily of riffles and cascades that are separated by pools. The deepest part of the river channel is located on the right (outside bend of the river at the upper end of McGregor Meadows, and on the left (outside) bend at the lower end. Flood velocities in this part of the channel attain 10 or more feet per second, and depths up to 10 feet during the 100-year flood. These velocities and depths are more than adequate to transport the coarse bedload of the river, which has a mean particle diameter of five inches. The high velocities are also more than sufficient to rapidly erode the fine-grained bank deposits.

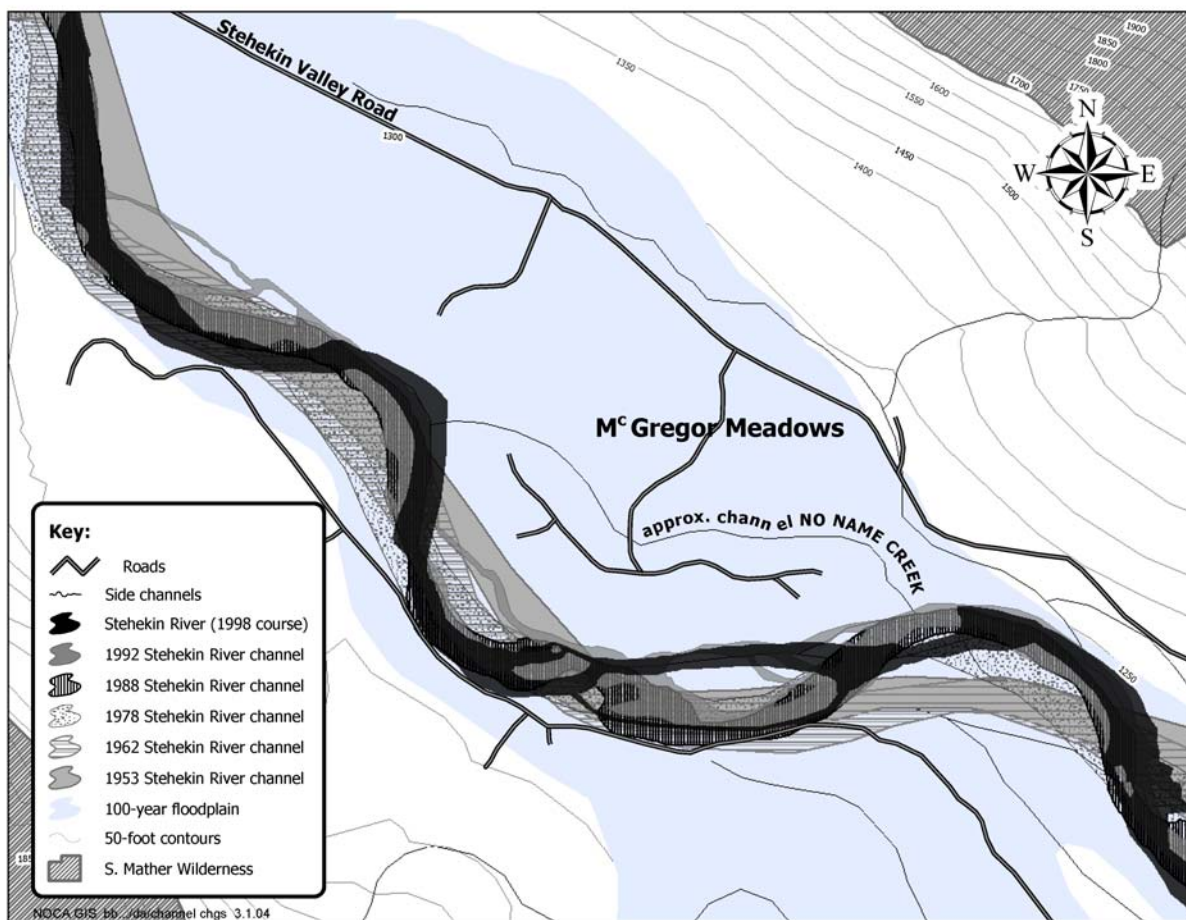


Figure 6. Stehekin River channel changes from 1953-1998.

River processes in the vicinity of McGregor Meadows are strongly conditioned by human activity. A recent inventory of erosion control structures on the lower Stehekin River identified streambank protection structures at 12 sites covering 2,378 linear feet. In the past eleven years 11 rock barbs at 3 sites have been built to address erosion concerns. The NPS is responsible for work at one site covering 1,505 linear feet that protects the Company Creek Road, across the river from McGregor Meadows.

## Water Quality

The surface water in Lake Chelan National Recreation Area, including the Stehekin River, is Class AA (extraordinary), having excellent quality with few exceptions. Class AA waters are given maximum protection under state water quality regulations (Washington Administrative Code 173-201 A).

## Air Quality

The lower Stehekin Valley was designated as a Class II air quality area under the Clean Air Act. Although the air quality in the valley is generally very good, it is affected by pollution emissions within and outside the valley. Air quality is important for health, visitor enjoyment, scenic vistas, and preservation of natural systems and cultural resources.

## Vegetation

The vegetation in McGregor Meadows has been significantly altered by human occupation and development. Most areas have been impacted by roads, building sites, yards, gardens and agricultural fields/pasture. These actions have exacerbated the problem of rapid scour and erosion in McGregor Meadows during flooding. The overstory in the project area is comprised of mature Douglas-fir (*Pseudotsuga menziesii*), ponderosa pine (*Pinus ponderosa*), big-leave maple (*Acer macrophyllum*), Pacific dogwood (*Cornus nutallii*) and western red cedar (*Thuja plicata*). The project area lies in a floodplain and is adjacent to the Stehekin River. The understory is open and there are few shrubby species. Bracken fern (*Pteridium aquilinum*) and snowberry bushes (*Symphoricarpos albus*) are common along with a variety of grasses and sedges that grow in shady habitats with moist, organic soil. No plant species currently listed by the U.S. Fish and Wildlife Service or the Washington Department of Natural Resources as sensitive, threatened, or endangered are known to occur in the project area. A rare plant survey was conducted in the spring of 2001 and no rare plant species were found.

## Wetlands

In 1990 the NPS surveyed the Stehekin Valley for wetlands. Wetlands were determined by the presence of plant communities identified by the Federal Interagency Committee for Wetland Determination 1989. Based on these guidelines it was determined that there are no wetlands within the project area.

**Wildlife** - Species listed as threatened or endangered or proposed for listing by either the U.S. Fish and Wildlife Service or the Washington Department of Fish and Wildlife are considered in this assessment. In addition, candidate species and species about which there is insufficient information, but for which there is concern (species of concern), are considered (Table 3).

**Gray wolf** (*Canus lupus*) and **Grizzly Bear** (*Ursus arctos*) have not been sighted in the Stehekin Valley below High Bridge in the past 10 years although suitable habitat exists. There have been confirmed sightings of both species in the past 10 to 20 years within 10 miles of the project site.

**Canada lynx** (*Lynx canadensis*) feed primarily on snowshoe hares and populations of the two species are expected to overlap significantly. A vertebrate inventory conducted in 1990 and 1991 documented snowshoe hare presence in the Stehekin Valley. There have been at least four unconfirmed sightings of lynx in the lower valley (below High Bridge) between 1975 and 2000. However, the habitat affected by the project is not considered typical of that normally used by lynx. Lynx habitat is usually higher elevation, above 3,000-4,000 feet in lodgepole pine, subalpine fir, and or Engelmann spruce forests.

**Pacific Fisher** (*Martes pennanti*) Recent inventories (Kuntz and Glesne 1993, Duke Engineering and Services 2000) did not document the presence of fishers in the Stehekin Valley. Fishers are generally associated with late-successional coniferous and mixed coniferous-deciduous forests, though second growth forest with good cover may also be used. Core habitat zones on the east-slope of the Cascades include subalpine fir and grand fir/Douglas-fir forests. Fishers require snags and logs for natal and maternal dens and rest sites.

Table 3. Federal and Washington State listed wildlife species and species of concern for which there is suitable habitat in the Stehekin Valley.

Species		Status	
Common Name	Scientific Name	Federal	State
Gray Wolf	<i>Canis lupus</i>	E	E
Grizzly Bear	<i>Ursus arctos</i>	T	E
Canada Lynx	<i>Lynx canadensis</i>	T	T
Pacific Fisher	<i>Martes pennanti pacifica</i>	SC	E
California wolverine	<i>Gulo gulo luteus</i>	SC	T
Western Gray Squirrel	<i>Sciurus griseus griseus</i>	SC	T
Long-eared Myotis	<i>Myotis evotis</i>	SC	
Fringed Myotis	<i>Myotis thysanodes</i>	SC	
Long-legged Myotis	<i>Myotis volans</i>	SC	
Yuma Myotis	<i>Myotis yumanensis</i>	SC	
Townsend's Big-eared Bat	<i>Corynorhinus townsendii</i>	SC	C
Bald Eagle	<i>Haliaeetus leucocephalus</i>	T	T
Northern Spotted Owl	<i>Strix occidentalis caurina</i>	T	E
Harlequin Duck	<i>Histrionicus histrionicus</i>	SC	
Northern Goshawk	<i>Accipiter gentilis</i>	SC	T
American Peregrine Falcon	<i>Falco peregrinus anatum</i>	SC	E
Olive-sided Flycatcher	<i>Contopus borealis</i>	SC	
Little Willow Flycatcher	<i>Empidonax traillii brewsteri</i>	SC	
Golden Eagle	<i>Aquila chrysaetos</i>		C
Merlin	<i>Falco columbarius</i>		C
Flammulated Owl	<i>Otus flammeolus</i>		C
Vaux's Swift	<i>Chaetura vauxi</i>		C
Lewis' Woodpecker	<i>Melanerpes lewis</i>		C
Black-backed Woodpecker	<i>Picoides albolarvatus</i>		C
Pileated Woodpecker	<i>Dryocopus pileatus</i>		C
Bull Trout	<i>Salvelinus confluentus</i>	T	
Westslope Cutthroat Trout	<i>Oncorhynchus clarki lewisi</i>	SC	
Tailed Frog	<i>Ascaphus truei</i>	SC	
Western Toad	<i>Bufo boreas</i>	SC	C
Cascades Frog	<i>Rana cascadae</i>	SC	
Columbia Spotted Frog	<i>Rana luteiventris</i>	SC	C

**California Wolverine** (*Gulo gulo*) occurs in low densities, mostly in subalpine and alpine habitat zones. However, it can occur in Silver Fir and other lower elevation forests. There are 2 records in NOCA's Wildlife Observation Database of unconfirmed wolverine observations in the Stehekin Valley in January 1974 June 1983.



**Western Gray Squirrel** (*Sciurus griseus*) is associated with the grand fir/Douglas-fir habitat zone in the Stehekin Valley. They probably feed on fungi, and the seeds of pine, fir, bigleaf maple, and vine maple. Current population status in the Stehekin Valley is unknown, however, individuals continue to be observed annually.

**Long-eared Myotis** (*Myotis evotis*), **Long-legged Myotis** (*Myotis volans*), and **Yuma Myotis** (*Myotis yumanensis*) are known to be present in the Valley. **Fringed Myotis** (*Myotis thysanodes*) and **Townsend's Big-eared Bat** (*Corynorhinus townsendii*) have not been detected in the Valley, however there is suitable habitat.

**Bald Eagle** (*Haliaeetus leucocephalus*) In 2001, a pair nested near Weaver Point, fledging one eaglet. Bald Eagles are occasionally seen perched in large trees at the head of Lake Chelan during the fall and winter.

**Northern Spotted Owl** (*Strix occidentalis caurina*) Kuntz and Chrispersen (1996) identified three nesting pairs and two apparently unpaired owls between Bridge Creek and Flick Creek near the southern boundary of the Lake Chelan NRA.

**Harlequin Duck** (*Histrionicus histrionicus*) Surveys completed in the early 1990s concluded that 7 to 11 pairs nest along the Stehekin River between High Bridge and the head of Lake Chelan. Harlequins arrive in April and start nesting by the beginning of May. Young are usually first seen on the Stehekin River and its tributaries by late June - early July. Males leave the river by early July, migrating back to the Pacific Coast. Females and juveniles return to the coast in August to early September.

**Northern Goshawk** (*Accipiter gentilis*) Kuntz and Glesne (1993) documented the occurrence of this species in upland mesic conifer and deciduous riparian forests within the Stehekin Valley. Goshawk nests were noted on the eastside of Lake Chelan. Recently fledged goshawks were seen above High Bridge. Evidence of old nests suggests these areas have probably been used for many years.

**American Peregrine Falcon** (*Falco peregrinus anatum*) Recent inventories (Kuntz and Glesne 1993, Duke Engineering and Services 2000) also did not detect this species in the Stehekin Valley.

**Olive-sided Flycatcher** (*Contopus borealis*) Within the Stehekin Valley, Kuntz and Glesne (1993) documented these flycatchers using deciduous riparian forests along the Stehekin River.

**Little Willow Flycatcher** (*Empidonax traillii brewsteri*) There is only one record in the NOCA Wildlife Observation Database for the Stehekin Valley, an individual observed in June 1986 near the head of Lake Chelan.

**Golden Eagle** (*Aquila chrysaetos*) While Golden Eagles are occasionally seen flying high over the Stehekin Valley, the valley does not represent suitable habitat.

**Merlin** (*Falco columbarius columbarius*) NOCA's Wildlife Observation Database contains three records of Merlins seen in the Stehekin Valley (June 1986, May 1993, September 1995). These records probably represent birds migrating through the valley.

**Flammulated Owl** (*Otus flammeolus*) The Stehekin Valley lacks suitable habitat for this owl. There are no records of occurrence of this species with NOCA.

**Vaux's Swift** (*Chaetura vauxi*) Park studies (Kuntz and Glesne 1993, NOCA Wildlife Observation Database) have documented this species as regularly occurring in the Stehekin Valley from May through September.

**Lewis' Woodpecker** (*Melanerpes lewis*) There is one unconfirmed record in the NOCA Wildlife Observation Database of a bird at the head of Lake Chelan (May 1971). Suitable habitat is lacking within the Stehekin Valley.

**Black-backed Woodpecker** (*Picoides arcticus*) There are three records in the NOCA Wildlife Observation Database. All three records occurred between July 25 and August 13. They probably represent post-breeding movements.

**Pileated Woodpecker** (*Dryocopus pileatus*) Their key habitat need is the presence of large snags used for nesting and roosting. It is estimated that approximately three to four pairs are resident within the Stehekin Valley (Kuntz and Glesne 1993).

**Bull trout** (*Salvelinus confluentus*) Historically, inhabited the Stehekin River and Lake Chelan. However, they have not been found in recent surveys. Limited survey information and survey techniques do not allow the conclusion that the species is extirpated from the river or the lake. The National Park Service maintains bull trout habitat to protect any remaining populations and to preserve the option of species restoration. The actions proposed in this assessment would not adversely impact bull trout or potential for its recovery.

**Westslope Cutthroat trout** (*Oncorhynchus clarki lewisi*) are present in the Stehekin River and tributaries. Populations below Bridge Creek are highly impacted from hybridization with rainbow trout.

A survey conducted in 1991 (Kuntz and Glesne 1993) documented **Cascades frog** (*Rana cascadae*), **western toad** (*Bufo boreas*), and **Columbia spotted frog** (*Rana luteiventris*) in a variety of moist habitats in the valley. There have been no recent observations of **tailed frog** (*Ascaphus truei*) in the Stehekin Valley. However, there is suitable habitat for both species.

## **Archeological and Historical Resources**

There are no known archeological sites in the project area. An old log cabin, known as the Knok cabin is located on private land in McGregor Meadows. The cabin was reportedly used as the first school in the Stehekin Valley.

## **Access and Transportation**

Access to McGregor Meadows and areas farther up valley is by way of the Stehekin Valley Road. The road is paved for the first four miles to Harlequin Bridge. Above mile four it is a narrow gravel road. Traffic is generally light consisting primarily of local resident vehicles, shuttle busses and NPS vehicles.

## **Recreation and Visitor Experience**

July, August, and September are the busiest months for visitation; over 50% of yearly visitation occurred during these months in 1991 through 1996. In the McGregor Meadows area, recreation activities are primarily confined to the Stehekin Valley Road or the Stehekin River. The Stehekin River is popular for rafting and fishing. The Stehekin Valley Road provides access to the upper Stehekin Valley and North Cascades National Park. The road is becoming increasingly popular for bicyclists.

## Private Property

There are 12 private property parcels, totaling 51.3 acres, in the McGregor Meadows area (Table 4).

Table 4. Private property in the McGregor Meadows area including acres, development status, acquisition priority and proposed minimum interest. (from 1995 Land Protection Plan)

<b>Tract</b>	<b>Acres</b>	<b>Developed?</b>	<b>Acquisition Priority</b>	<b>Proposed Minimum Interest</b>
07-114	4.00	Y	High	Easement
07-116	1.60	Y	Low	Easement
07-157	28.70	Y	High	Fee/Easement
07-161	0.63	Y	Low	Fee
07-172	1.24	Y	High	Easement
07-176	2.48	Y	High	Easement
07-177	0.64	Y	Low	Fee
07-184	0.80	N	Low	Easement
07-185	0.97	Y	Low	Fee
07-186	3.53	Y	High	Easement
07-199	4.97	Y	High	Easement
07-200	1.74	N	Moderate	Easement

## Economics

There are no commercial operations in the McGregor Meadows area. The Stehekin Valley Ranch, about three miles up valley is an important commercial operation during the summer providing lodging (cabins) and a restaurant. During the visitor season the road is used by both private and National Park Service shuttle busses. Winter and early spring snowshoeing is an increasingly popular commercial visitor use activity. The road is used to transport showshoers to and from trailheads between the Stehekin Landing and Nine-mile.

## IMPACTS

### Methodology For Evaluating Impacts

The following terminology used to describe impacts are common to all resource topics:

#### Type of Impact

- Adverse: Moves the system outside of or away from the desired condition.
- Beneficial: Moves the system inside or toward the desired condition (also positive).

#### Duration of Impact

- Short-term: During construction or for one season (also short duration).
- Long-term: More than one year.

#### Intensity of Impact

- Negligible: Imperceptible or undetectable.
- Minor: Slightly perceptible and limited in extent. Without further actions, adverse impacts would reverse, and the resource would recover.
- Moderate: Readily apparent but limited in extent. Without further actions, adverse impacts would eventually reverse, and the resource would recover.
- Severe: Substantial, highly noticeable, and affecting a large area. Changes would not reverse without active management.

### Impact of Alternative A. No Action (Environmentally preferred alternative)

#### Geology and Soils

Adverse impacts would include manipulation of soils and the riparian zone along "No Name Creek" to replace a small private bridge which washed out in the October 2003 flood. The bridge provided access to private and NPS property and was maintained by private property owners. Continued erosion and emergency repairs contribute to long-term addition of sediment to the river. Further erosion and temporary closure of the Stehekin Valley Road is very likely in this area. Repeatedly, floods have scoured the road surface, removing the gravel and depositing it in the Stehekin River and in wetlands downstream. Under this alternative the river would continue to wash gravel away and transport it down stream impacting riparian areas and the river. The Company Creek gravel pit would be impacted by removal of additional material for road repair.

The Sand, Rock and Gravel Plan limits excavation from the Company Creek gravel pit to 1,200 cubic yards per year for National Park Service use, however, the Superintendent can authorize exceeding this limit in an emergency.

#### Hydrology

The primary beneficial impact to hydrology in this alternative is allowing natural river processes to proceed on federal land. Adverse impacts would result from continued river erosion of private land and possible installation of erosion control structures by private landowners. Possible replacement of the bridge over No Name Creek by private property owners, could result in additional adverse impacts to the hydrology of the creek from manipulation of the bank during construction.

There would be no increase in discharge, water surface elevation or water velocity at this site. This alternative would have no impact on the floodplain. The river would continue the natural process of

meandering through the floodplain, continuing to erode the streambanks especially on the outside of the bends.

### **Wetlands**

The removal of gravel and fine material from the road and depositing these materials in wetlands downstream from the site would adversely impact wetland areas. The natural process of realignment of the Stehekin River could eventually create new wetlands if the existing river channel is abandoned.

### **Water Quality**

Gravel and fine soils particles along with pollutants from vehicles (oil, gas) would wash into the river and downstream wetlands as the roadbed is eroded resulting in a short-term impact on water quality. During flooding this additional material would probably be minor. Continued erosion of channels, including No Name Creek, would contribute additional sediment to the river. Fine sediment adversely affects aquatic habitat. Bank erosion has claimed several properties and their wells and septic systems in the past decade. Erosion of these features could have a moderate adverse impact on water quality.

### **Air Quality**

Short-term increases in machinery emissions would occur along the road corridor during repairs. There could be an increase in dust along the road depending on when repairs when made. Residents living close to the road would be affected by decreased air quality and noise during repairs. The impact of dust on residents would be mitigated by watering the road as necessary. Frequency and duration of the effects would depend upon the severity of the damage to the road.

### **Vegetation**

Over time, vegetation could be removed by the natural process of the river changing course. Non-native plants, such as knapweed, could be transported to the project area on the trucks bringing material from the Company Creek pit for road repairs. This would be minimized by removing exotic plants from the pit area.

### **Wildlife**

This alternative would not be expected to adversely affect any federal or state listed species. The noise associated with repairs in the spring would be no greater than from normal traffic on the road. Spotted owls may be affected but are not likely to be adversely affected. There would be no affect on other listed species.

### **Archeological and Historical Resources**

This alternative would have no effect on known archeological or historical resources in the area.

### **Access and Transportation**

Motor vehicle access above mile 5.5 could be limited or halted due to erosion and for road repairs after future flood events, impacting owners of private property above mile 5.5. The duration of the closures would depend on the severity of the damage and the ease with which material for repairs could be obtained. During closures the ability of the NPS and residents to respond to an emergency at or above McGregor Meadows would be greatly diminished or eliminated. Over time, access to private property

could be eliminated due to growth of the flood channels. Growth of the flood channels and eventual realignment of the Stehekin River could result in the loss of this section of the Stehekin Valley Road.

### **Recreation and Visitor Experience**

This alternative could adversely effect recreation or visitor experience when the road washed out during a flood and repairs could not be completed prior to the visitor season. However, there would be no

### **Private Property**

There would be a temporary loss of access to McGregor Meadows and areas upvalley as the road is eroded during floods. The continued growth of small flood channels would result in more frequent and increasingly severe flooding of private property. Over time, growth of the flood channels and eventual realignment of the Stehekin River could result in the loss of private property in the McGregor Meadows area. Private property owners could take action to protect their property. Any such actions would have to be confined to private property and permits would have to be obtained from the appropriate permitting authorities.

### **Economics**

In the short-term some residents and visitors would be adversely affected by interrupted access to the properties and facilities located in and above McGregor Meadows during road closures and repairs after flooding. The impact on visitors, shuttle bus service, and business farther up valley would likely be minimal since most floods are either before of after the visitor season. Growth of the flood channels and eventual realignment of the Stehekin River could result in the loss of this section of the Stehekin Valley Road necessitating relocation of the road out of the floodplain.

In the long-term the effects could become more major. The continued growth of flood channels could eliminate access to private property in McGregor Meadows across the existing bridge. Ultimately, private property could be lost due to realignment of the Stehekin River. Also, access to the upper Stehekin Valley could be halted pending extensive repairs or rerouting of the road.

Cost of repairing damage to the road is difficult to predict. Relatively minor damage might require only replacement of the gravel surface at a cost of approximately \$20 per cubic yard.

### **Cumulative Impacts**

In the past the NPS has constructed rock barbs up-valley at 8-mile to protect the Stehekin Valley Road. Rock barbs and bank armoring has also been done along the Company Creek Road across the river from the McGregor Meadows area. The flood of October 2003 necessitated two minor emergency reroutes at mile 7.0 and 7.5 of the Stehekin Valley Road above McGregor Meadows. This alternative would not result in an increase the cumulative impacts on resources including geology and soils, hydrology, wetlands, water quality, air quality, vegetation, wildlife, archeological and historical resources, access and transportation, recreation and visitor experience, private property, economics.

### **Summary and Conclusion**

Based on the above discussion of potential environmental consequences we have determined that this alternative would not result in impairment of resources and values.

- Geology and Soils: Natural processes could result in moderate, long-term, adverse impact.

- Hydrology: Potential impact would be beneficial by allowing natural processes to function. There would be no adverse impact on the floodplain.
- Wetlands: Natural processes could result in moderate, long-term, adverse impact.
- Water Quality: Natural processes could moderate, short-term, adverse impact.
- Air Quality: Potential adverse impact would be minor and short-term.
- Vegetation: Natural processes could result in moderate, long-term, adverse impact on vegetation. There would be no impact on rare species.
- Wildlife: The action might affect but is not likely to adversely affect spotted owls. There would be no affect on other threatened or endangered wildlife species. Adverse impact on non-listed species would be minor but could be long-term.
- Archeological and Historical Resources: No archeological or historical resources would be affected.
- Access and Transportation: Adverse impact could be moderate and long-term.
- Recreation and Visitor Experience: Adverse impact could be moderate and long-term.
- Private Property: Potential adverse impact could be severe and long-term.
- Economics: Potential adverse impact on the specific area could be severe and long-term.

### **Impact of Alternative B. Construct Grade Control Structures and Place a Rise in the Road (Preferred Alternative)**

#### **Geology and Soils**

This alternative would have beneficial impacts on geology and soils in McGregor Meadows by reducing deep incising by erosion along overflow channels. Some compaction and disturbance of soil would occur during construction, although all soils in the area are coarse textured. Installation of the grade control structures would require excavation of a trench approximately two feet wide, two feet deep, and five feet long across the overflow channels just upstream of the point of active erosion. These trenches would then be filled with large angular rock with their upper surfaces built at grade. The grade control structures would not interrupt the natural contours of the landscape.

The NPS is constrained through the Sand, Rock, and Gravel Plan, LACH, 1995 from obtaining rock in the Stehekin Valley except from the existing gravel pit on Company Creek Road. Since large angular rock is not available at the pit it would have to be barged in from the Chelan area.

Access would use existing routes or cleared areas. Routes would not be graded or otherwise improved. Tire marks or other indentations would be filled or raked to be unnoticeable.

#### **Hydrology**

The growth of many small channels, which are occupied only during large floods, would be limited. As a result, sheet flow conditions would be maintained in the meadow. Flood waters would continue to inundate the Stehekin Valley Road and areas of McGregor Meadows but erosion in the overflow channels would be slowed by the grade control structures. No Name Creek would continue to expand as the main channel of the Stehekin Rive shifted. There would be a negligible impact on the floodplain.

#### **Wetlands**

There are no wetlands in the project area, therefore there would be no direct impact to wetlands. Limiting erosion in the meadows would result in a beneficial impact to wetlands downstream of McGregor Meadows by limiting the erosion of fine soil and gravel from the road.

## **Water Quality**

The grade control structures would have no direct adverse impact on water quality because they would be placed on dry land above the ordinary high water mark. Indirectly, the structures could improve water quality by limiting erosion of fine soil particles and gravel from the Stehekin Road. They would also limit damage to private septic drain-fields in the area, thereby protecting water quality.

## **Air Quality**

Hauling the rock needed for this project would require approximately two to four five-yard dump truck trips from the Stehekin Landing to McGregor Meadows. This would create a short-term increase in machinery emissions, dust and noise on Stehekin Valley Road. Equipment used at the sites would also contribute to dust and emissions in the immediate vicinity of the meadows. The impact from dust would be mitigated by watering the road.

## **Vegetation**

There would be a minor impact on vegetation from access to the sites with equipment and from digging the trenches. This would be mitigated by revegetating disturbed areas with native species salvaged at the sites. Access would be routed and trenches positioned so that no trees would be removed.

## **Wildlife**

This alternative would require equipment use away from the existing road however, the noise associated with this would be no greater than noise from traffic on the road. Therefore, this alternative may affect, but is not likely to adversely affect the northern spotted owl. There would be no affect on grey wolf, grizzly bear, Canada lynx, bald eagle, or bull trout.

## **Archeological and Historical Resources**

This alternative would have no effect on the known archeological resources of the area. However, there is a potential for subsurface historical and archeological artifacts. A NPS archeologist would be on site during the excavation of the trenches for grade control structures. This would ensure that any historical or archeological discoveries would be handled according to federal and state regulations. Specific construction sites, once selected, will be surveyed by an archeologist prior to ground disturbance. If necessary, excavation sites will be relocated to avoid potential disturbance of cultural resources.

## **Access and Transportation**

Approximately 10 dump truck trips from the Stehekin Landing would be required to complete the construction, causing a short-term increase in congestion on the road and inconvenience to people residing above McGregor Meadows. Access to the upper Stehekin Valley would be maintained. Eventual occupation of No-Name Creek by the Stehekin River would not adversely affect the Stehekin Valley Road. The rise in the road would have no impact on safe use and maintenance of the road.

## **Recreation and Visitor Experience**

Following the construction period there would be no affect on recreation or visitor experience. The potential for impact on visitors would be reduced by working on the project in the fall after October 1.



## **Private Property**

Twelve private property parcels would receive a beneficial impact from this alternative from continued access and shallower, less erosive flood waters. These properties would still experience flooding. Relief would likely be temporary with the likelihood that the river will eventually occupy "No Name Creek" or another channel negatively affecting most private property in the McGregor Meadows area. Private property owners could take action to protect their property. Any such actions would have to be confined to private property and permits would have to be obtained from the appropriate permitting authorities.

## **Economics**

Maintaining road access to and above McGregor Meadows would have a beneficial impact on the Stehekin Valley Ranch and on local businesses that provide visitor transportation. Some residents would benefit economically if construction was done by local contractors.

The actual cost of constructing grade control structures would be approximately \$500 each for a project total of \$4,000-\$5,000. This includes the cost of barging large angular rock into the valley, equipment to dig trenches for the grade control structures and labor for the construction.

## **Cumulative Impacts**

In the past the NPS has constructed rock barbs up-valley at 8-mile to protect the Stehekin Valley Road. Rock barbs and bank armoring has also been done along the Company Creek Road across the river from the McGregor Meadows area. The flood of October 2003 necessitated two minor emergency reroutes at mile 7.0 and 7.5 of the Stehekin Valley Road above McGregor Meadows. This alternative could result in a minor, adverse, long-term increase to the cumulative impact to geology and soils from excavation and placement of the grade control structures. However, this alternative would not result in an increase the cumulative impacts on hydrology, wetlands, water quality, air quality, vegetation, wildlife, archeological and historical resources, access and transportation, recreation and visitor experience, private property, economics.

## **Summary and Conclusion**

Based on the above discussion of potential environmental consequences we have determined that this alternative would not result in impairment of resources and values.

- Geology and Soils: Slowing erosion could result in moderate, long-term, beneficial impact.
- Hydrology: Potential impact would be beneficial and long-term. There would be no adverse impact on the floodplain. A statement of finding, as referenced in NPS Management Policies and Floodplain Management Manual (#77-2), has been prepared and is included in Appendix A.
- Wetlands: Slowing erosion could result in moderate, long-term, beneficial impact.
- Water Quality: Slowing erosion could result in moderate, long-term, beneficial impact.
- Air Quality: Potential adverse impact would be minor and short-term.
- Vegetation: Natural processes could result in moderate, long-term, adverse impact on vegetation. There would be no impact on rare species.
- Wildlife: The action might affect but is not likely to adversely affect spotted owls. There would be no affect on other threatened or endangered wildlife species. Adverse impact on non-listed species would be minor and short-term.
- Archeological and Historical Resources: No archeological or historical resources would be affected.
- Access and Transportation: Impact would be beneficial and long-term.
- Recreation and Visitor Experience: Impact would be beneficial and long-term.
- Private Property: Potential adverse impact could be severe and long-term.

- Economics: Potential adverse impact on the specific area could be severe and long-term.

### **Impact of Alternative C. Raise the Roadbed Through Lower McGregor Meadows**

#### **Geology and Soils**

Erosion would continue along No Name Creek and other overflow channels. Fine materials on the road surface would not be eroded.

The Company Creek pit would be expanded by removal of approximately 8,200 cubic yards of fill and rock. To illustrate, this excavation would be equivalent to an area 50 yards long, 10 yards high, and 16 yards deep. Large angular rock, not available in the Company Creek pit, would be shipped in from the Chelan area. This rock, approximately 2,000 cubic yards, would be used along the river side of the road to prevent erosion

The 1995 Sand, Rock, Gravel Plan limits excavation from the pit to 1,200 cubic yards per year except in emergency situations. An emergency variance to that plan would be required or the work would need to be done in phases over a 5-10 year period.

#### **Hydrology**

Implementation of the alternative would allow for unconstrained action by the river in the McGregor Meadows area. However, flood waters would be blocked from wetlands on the eastern side of the Stehekin Valley Road. Culverts placed under the road near the lower end of McGregor Meadows could limit some damming of water behind the raised road bed.

#### **Wetlands**

There would be no impact on wetlands.

#### **Water Quality**

There could be minor, short-term, adverse impact on water quality from sedimentation following construction. Such impact would be no greater than experienced under the existing conditions and the long-term impacts would be less because fine material would not be removed from the road surface during flooding.

#### **Air Quality**

Hauling the rock needed for this project would require about 820 10-yard dump truck trips from the Company Creek pit. There would also be approximately 200 trips from the Stehekin Landing to haul the angular rock. This would create a short-term increase in machinery emissions, dust and noise in the lower valley. A sprinkler/tanker truck would be used to reduce dust on the road between Company Creek pit and the project site.

#### **Vegetation**

All work on the road would be within the existing road corridor therefore, no vegetation would be impacted. Exotic plants could be transported to the project area on the trucks bringing material from the Company Creek pit. This could be mitigated by insuring that exotic plants are removed from the pit and

the access road to the pit prior to hauling. This alternative would not affect any sensitive or listed plant species.

### **Wildlife**

The noise associated with this would not be significantly greater than noise from normal traffic on the road. Therefore, since there would be no removal of habitat, this alternative may affect, but is not likely to adversely affect the northern spotted owl or Canada lynx. There would be no impact on grey wolf, grizzly bear, bald eagle or bull trout.

### **Archeological and Historical Resources**

This alternative would have no effect on archeological or historic resources on federal land in the area.

### **Access and Transportation**

Approximately 820 10-yard dump truck trips would be required to complete the construction, causing increased congestion on the road and inconvenience to people residing above Harlequin Bridge on the Company Creek road or on the Stehekin Valley road. An additional 200 trips would be required from the Stehekin Landing to transport the angular rock. Impacts on visitors would be reduced by hauling after October 1.

### **Recreation and Visitor Experience**

Visitors could be impacted during construction by increased traffic and dust. A water truck would be used to reduce dust. After construction there would be no impact on recreation or visitor experience other than that road would not be closed at this site due to flooding. Potential impact on visitors would be mitigated by delaying construction until after Labor Day. Although the road would only be raised approximately two feet, this could be a safety issue.

### **Private Property**

Under this alternative the 12 private properties located in McGregor Meadows would continue to be flooded. Private property owners would be affected by flooding at the same frequency as they are now. The intensity of flooding would likely increase over time as the channels eroded further and the river continued to change course. In addition, spread of the flood waters would be constrained by the raised road bed. This could result in greater impact on private property on the westerly side of the Stehekin Valley Road. Private property owners could take action to protect their property. Any such actions would have to be confined to private property and permits would have to be obtained from the appropriate permitting authorities.

### **Economics**

Some residents would benefit economically if the work was done by local contractors. Owners of property in McGregor Meadows would be impacted by continued periodic flooding. There would be a positive impact on Stehekin Valley Ranch and local transportation providers by protecting the road. The cost of rock excavated from the Company Creek gravel pit and hauled to the site is estimated at approximately \$70,000. Large rock barged to Stehekin would cost approximately \$90,000.

## **Cumulative Impacts**

In the past the NPS has constructed rock barbs up-valley at 8-mile to protect the Stehekin Valley Road. Rock barbs and bank armoring has also been done along the Company Creek Road across the river from the McGregor Meadows area. The flood of October 2003 necessitated two minor emergency reroutes at mile 7.0 and 7.5 of the Stehekin Valley Road above McGregor Meadows. Raising 0.6 mile of the Stehekin Valley Road by three feet as proposed in this alternative could result in a moderate increase in the cumulative impacts on hydrology and the dynamics of the Stehekin River and its floodplain by constraining water flow through the area. However, this alternative would not result in an increase the cumulative impacts on geology and soils, wetlands, water quality, air quality, vegetation, wildlife, archeological and historical resources, access and transportation, recreation and visitor experience, private property, economics.

## **Summary and Conclusion**

Based on the above discussion of potential environmental consequences we have determined that this alternative would not result in impairment of resources and values.

- Geology and Soils: Natural processes could result in moderate, long-term, adverse impact.
- Hydrology: Potential impact would be beneficial by minimizing manipulation of natural processes. There would be no adverse impact on the floodplain.
- Wetlands: Natural processes could result in moderate, long-term, adverse impact.
- Water Quality: Natural processes could moderate, short-term, adverse impact.
- Air Quality: Potential adverse impact would be minor and short-term.
- Vegetation: Natural processes could result in moderate, long-term, adverse impact on vegetation. There would be no impact on rare species.
- Wildlife: The action might affect but is not likely to adversely affect spotted owls. There would be no affect on other threatened or endangered wildlife species. Adverse impact on non-listed species would be minor but could be long-term.
- Archeological and Historical Resources: No archeological or historical resources would be affected.
- Access and Transportation: Adverse impact could be moderate and long-term.
- Recreation and Visitor Experience: Adverse impact could be moderate and long-term.
- Private Property: Potential adverse impact could be severe and long-term.
- Economics: Potential adverse impact on the specific area could be severe and long-term.

## **CONSULTATION AND COORDINATION**

### **Internal and Public Scoping**

Meetings were held with members of the Stehekin community regarding their concerns. The Stehekin Community held a meeting with a private geomorphologist. The meeting was attended by representatives from the NPS. The park interdisciplinary team, consisting of representatives from resource management (natural and cultural), maintenance, rangers, interpretation, administration and management have discussed issues and concerns related to protection of the road in this area.

The U.S Fish and Wildlife Service was contacted early in the process regarding concerns related to listed species. A private geomorphologist was consulted concerning possible solutions to the problem at McGregor Meadows.

Based on internal and public scoping the following topics were dismissed from consideration:

- Wilderness: The project area is not in wilderness, and none of the alternatives considered would impact wilderness lands.
- Wild and Scenic River: None of the alternatives considered would impact the Stehekin River's potential suitability as a Wild and Scenic River.
- Native American religious practices: None of the alternatives considered would impact Native American religious practices.
- Low income populations: None of the alternatives considered would impact minority or low income populations.

#### Public Review

The EA will be sent to Stehekin property owners and residents and other individuals and organizations with interest in the Lake Chelan National Recreation Area. Copies of the EA will be sent to public libraries in Chelan and Wenatchee. A press release will also be sent to newspapers in Chelan and Wenatchee and the document will be posted on the North Cascades National Park Service Complex web site.

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## Appendix A. Floodplain Management: Statement of Finding

**Floodplain Statement of Findings  
for  
Protection of the Stehekin Valley Road  
in the Vicinity of McGregor Meadows  
Lake Chelan  
National Recreation Area**

Recommended:

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Superintendent, North Cascades National Park Service Complex

Date

Concurrence:

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Regional Safety Officer

Date

Certification of Technical Adequacy and Statewide Consistency:

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Chief Water Resources Division  
or Professional Fluvial Geomorphologist, National Park Service

Date

Approved:

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Regional Director Pacific West Region, National Park Service

Date

## Introduction

The National Park Service (NPS) has prepared an Environmental Assessment (EA) for protection to the Stehekin Valley Road in the vicinity of McGregor Meadows in the Lake Chelan National Recreation Area. This statement of findings pertains to the NPS preferred alternative for preventing the Stehekin River from following a new course down the main Stehekin Valley Road. This road is the primary visitor access route to Lake Chelan National Recreation Area, and the only road to access private property upvalley.

Under the preferred alternative, eight to ten grade control structures would be constructed in overflow channels in McGregor Meadows and a rise would be placed in the Stehekin Valley Road (Figure 1). Each grade control structure would use one to two cubic yards of large angular rock each, for a maximum total of 10 to 20 cubic yards. Installation of the grade control structures would require excavation of a trench across the overflow channels just above the head cut (area of active erosion), filling with large angular rock, and backfilling slopes to native contours (Figure 2).

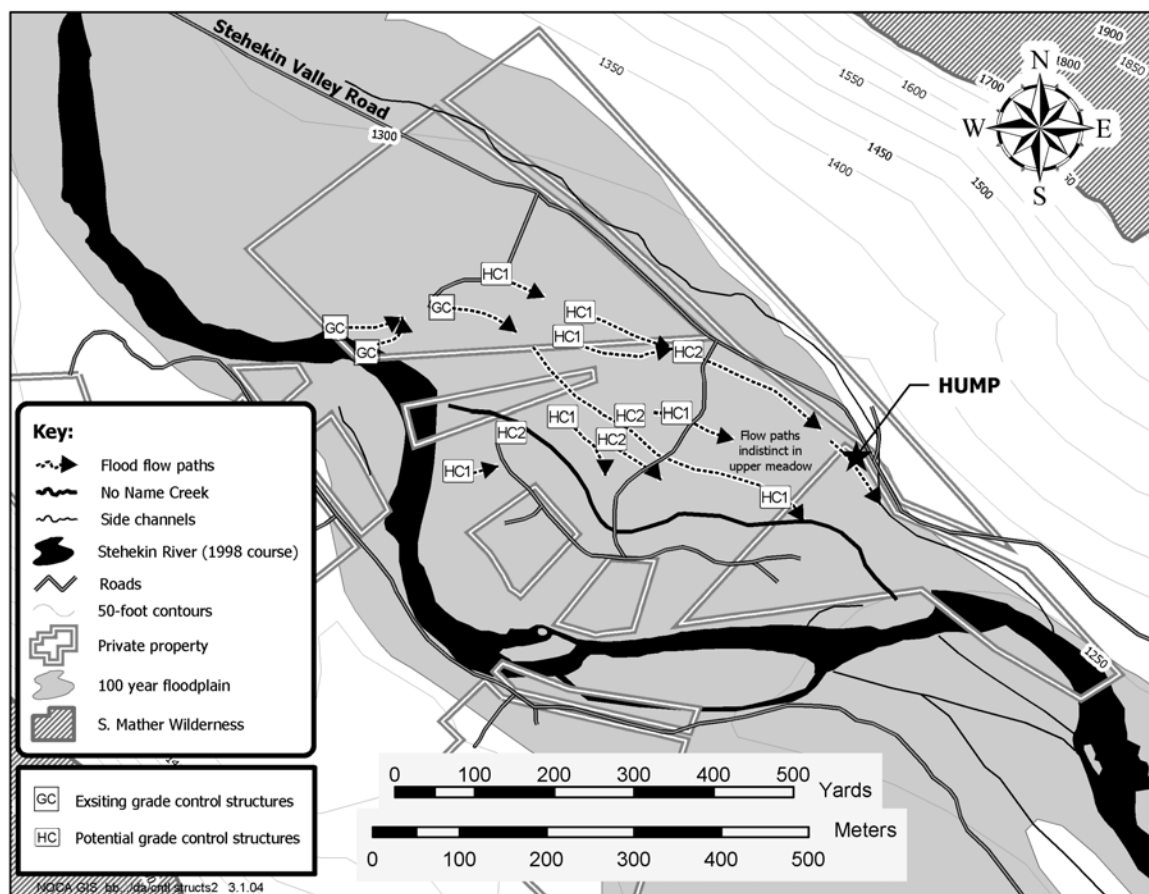


Figure 1. Location of existing and proposed grade control structures.



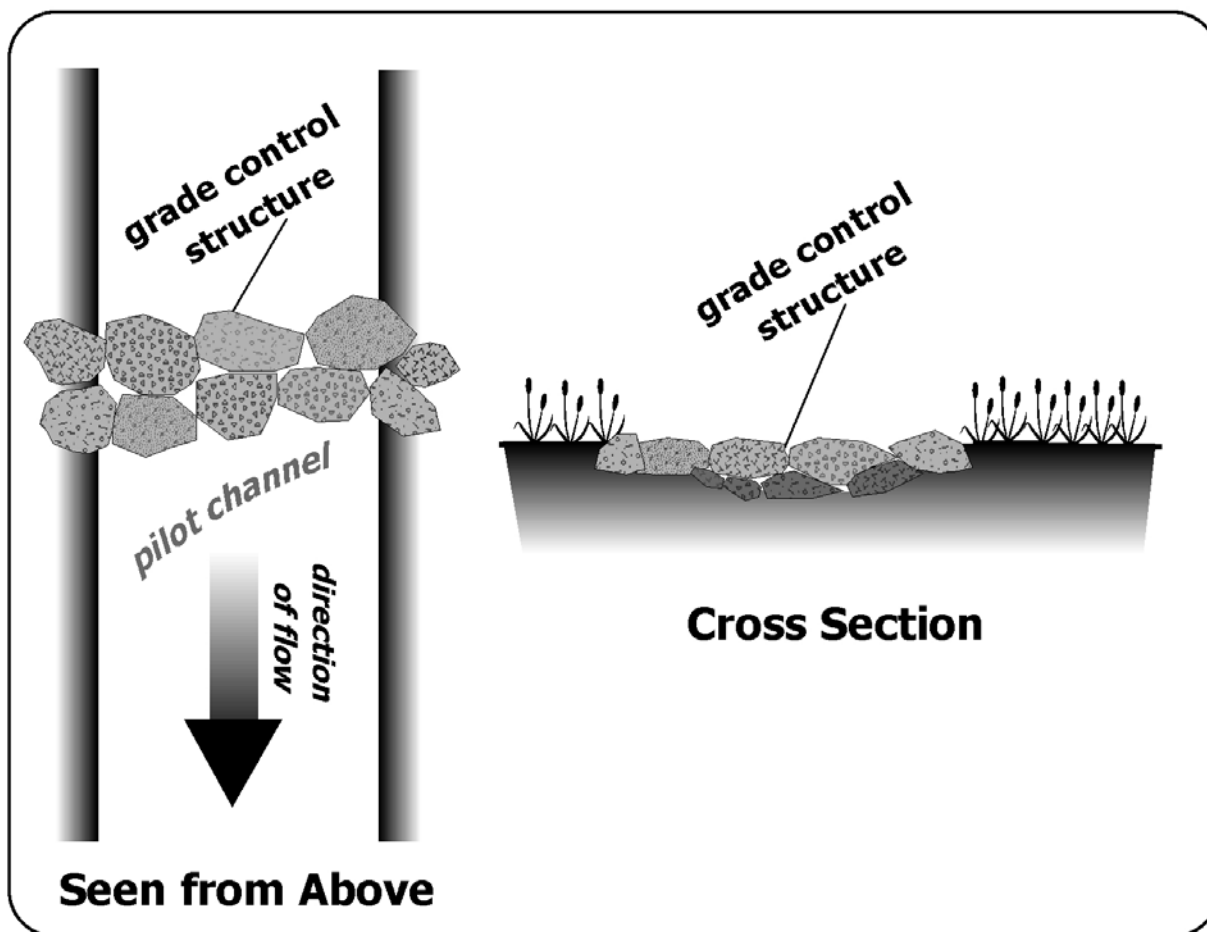


Figure 2. Schematic of proposed grade control structures.

Access to the sites would be directly from the Stehekin Valley road. Existing routes would be used to the extent possible. Where routes do not exist, access would be through existing clear areas. No additional clearing would be done nor would routes be graded. The rise in the road would span the existing road width and would be about two feet high at the highest point gradually tapering down to existing road level. Total length of the rise would be 50-100 feet. This feature would prevent flood water and the main Stehekin River channel from occupying the road. The rise would not interfere with safe use and maintenance of the road.

These actions would be designed to maintain sheet flow through McGregor Meadows and to minimize channelization of floodwater flow down the Stehekin Valley Road, thus reducing scouring of the Stehekin Valley Road and potential for the river to realign itself by following the path of least resistance, which is down the roadway. None of these structures would prevent flooding or raise the water surface elevation. These actions also would not prevent the Stehekin River from ultimately cutting a new channel through McGregor Meadows.

The primary purpose of the grade control structures and the rise in the road would be to maintain sheet-flow flooding of the meadows by limiting the growth of flood channels through the meadow, and to limit the river's ability to flow down the Stehekin Valley Road. This option, however, is not seen as a permanent fix for the flooding and erosion problem. Over the long term the Stehekin River is expected to reclaim an old channel along No Name Creek through the

middle of the McGregor Meadows. In this process it is likely that the river will continue to fill the existing river channel with gravel, deposit large woody debris near the upper end of the meadow, and erode the banks of the current channel.

### **Site Description**

The Stehekin Valley Road is located along McGregor Meadows on the valley floor of a deep glacial valley on the lower Stehekin River. The valley floor is relatively flat in comparison to near-vertical valley walls, and options for road relocations are severely limited. The valley floor in this reach includes high terraces, low terraces, flood channels, and the floodplain of the Stehekin River. The Stehekin Valley Road is located on what was a low terrace, but is now becoming the floodplain of the river.

Soils in McGregor meadows are Stapaloop and Goddard series, which are poorly developed entisols in recent Stehekin River alluvium. They have sandy skeletal textures and few fine soil particles, and very little organic matter. In most locations, A, O and B soil horizons have not developed due to the recent age of the deposits.

Vegetation in the area of McGregor Meadows was disturbed by historic farming activity in the early-to-mid 20<sup>th</sup> Century. At this time, native vegetation species and patterns have not recovered due to poor soils and recent activity of the river.

Most of the property in McGregor Meadows is owned by the NPS. However, there are several small private land holdings in the area, most of which have seasonal cabins. There are a few year-round residences. The NPS holds lifetime easements on several properties.

### **Justification for Use of the Floodplain**

The NPS has examined other alternatives in an Environmental Assessment (EA) of this problem, and rejected the alternative of relocating the road to higher ground at this time due to impacts on wildlife (spotted owl), vegetation and recreational use of the valley. Given this decision, we are left with two alternatives to protect the road in its current floodplain location. Alternative C of the EA focuses on elevating the road through the flood prone reach, but due to the amount of fill that would be placed in the floodplain and associated impacts, was not chosen as the preferred alternative.

Considering the large impacts of the other potential alternatives, the NPS is left with no choice but to keep the Stehekin River Road in its historic and present location in the floodplain of the Stehekin River. Further, the preferred alternative will not have significant impacts to floodplain or river processes, soils or vegetation.

### **Description of Site-Specific Flood Risk**

Flood depths for the 100-year event in this area are on the order of 2-3 feet (NPS, 1993). While main channel velocities are in the range of 6-7 feet/second, velocities on the left overbank along

the road are on the order of 3-4 feet/second, which is more than enough to erode the loose sandy soils and the loose road fill.

The amount of time required for warning of possible road flooding is on the order of a few hours to half a day. Flood waters will rise rather slowly at this site due to its current location some 500 feet or more from the active river channel. Further, the National Weather Service is preparing a flood warning system for the valley.

There is high ground available immediately adjacent to the site and a trail located ½ mile away for evacuation of the site if necessary. Further, the shallow nature of flooding at this site allows the NPS to get heavy equipment through this area in emergencies.

The portion of the Stehekin Valley Road of concern is generally located where the width of the valley and stream gradient change significantly. As a result of these changes, the Stehekin River deposits significant quantities of large woody debris and bedload gravel in this reach, and the river channel is notoriously unstable. Evidence from old maps, aerial photographs, and geomorphic surveys indicates that the river has switched back and forth between several channels in the past 150 years. Within this zone, the road is located on a low terrace within the 100 year floodplain of the river, but is presently located approximately 500 feet from the current main channel of the river on the left bank.

In the past 15 years, the Stehekin River has had six large floods. The November 1995 event was believed to have a 100-year recurrence interval, while the October 2003 event's recurrence interval is estimated by the USGS at 500 years. In addition to these exceptionally large floods, larger than normal spring floods occurred in 1997 and 1999, and 10-25 year recurrence events occurred in 1989 and 1990. At McGregor Meadows these floods have initiated a major realignment of the Stehekin River through McGregor Meadows. Recurrence interval of flooding at the site has changed with the passage of these large floods. In the 1980s, flooding of the site was infrequent, and limited to events of 10-year recurrence interval or greater. Due to floodplain and channel processes, the area now floods more frequently at lower discharges, and will likely be inundated at less than 10-year intervals during large fall and spring floods.

Changes in channel alignment at this site are resulting in increased flooding and scouring of the Stehekin Valley Road at the downstream end of McGregor Meadows. There is growing concern that during the next large flood that the main channel river will flow down the road.

### **Minimizing Impacts to Floodplain Values and the Public**

The proposed action, due to its design, will have minimum impacts to floodplain natural resources. Grade control structures will not interrupt natural floodplain contours because they will be buried below grade. Further, due to the lack of native vegetation cover and poorly developed soils, these structures will have minimal impact to other floodplain resources. The proposed action will improve floodplain values by eliminating some amount of crushed road gravel that is currently washed into flood channels.

The proposed action is not in a high flood hazard area, and work would be conducted at low flow periods on the river when there is no flood water at the site. Further, this action involves only minor modification of a gravel road and small scale grade control activity actions along a road in the floodplain

### **Summary**

This statement of findings accompanies an Environmental Assessment on impacts to the Stehekin river floodplain for actions designed to keep the main Stehekin Valley River from being occupied by the main channel of the Stehekin River. The passage of numerous large floods in the past 15 years, including a record 500-year event in October 2003, have resulted in increased flooding and damage to the Stehekin Valley Road. Hydraulic conditions at the site are moderate, with relatively shallow flood depths and low velocities. The proposed actions will have minimal impacts to floodplain values and people because the actions will not alter native contours or increase flood depth or velocity, and because soils are poorly developed and there is a lack of native riparian vegetation.